UNITED STATES PATENT AND TRADEMARK OFFICE

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10/664,508	09/16/2003	Terutake Kadohara	B588-554 (25815.566)	1754

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EXAMINER
CUTLER, ALBERT H

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>27 July 2009</u>.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-10</u> is/are pending in the application.
     4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-10</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
     a)☐ All   b)☐ Some * c)☐ None of:
       1.☐ Certified copies of the priority documents have been received.
       2.☐ Certified copies of the priority documents have been received in Application No. _____.
       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to communication filed on July 27, 2009.

Response to Arguments

2.   Applicant's arguments, see pages 2-5, filed July 27, 2009, with respect to the

rejection(s) of claim(s) 1-10 under 35 U.S.C. 103(a) have been fully considered and are

persuasive. Therefore, the final rejection has been withdrawn. However, upon further

consideration, a new ground(s) of rejection is made in view of TeWinkle (US 7,164,506)

and Saito et al. (US 7,042,491).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating
        obviousness or nonobviousness.

5.   Claims 1, 2 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable

over TeWinkle (US 7,164,506) in view of Saito et al. (US 7,042,491).

Consider claim 1, TeWinkle teaches:

An image sensing apparatus (figure 7) comprising:

an image sensing element ("image sensor array chips", 12) manufactured by a plurality of divisional exposure operations such that the image sensing element includes a first light receiving area ("I", figure 7) and a second light receiving area ("II", figure 7) which are formed on an image pickup surface of a semiconductor substrate (substrate, 14, figure 1) by the plurality of divisional exposure operations (A plurality of "sensor array chips" (12, i.e. chips manufactured by a plurality of divisional exposures) are butted end to end to form a single array of photosensors on the substrate (14), column 2, line 64 through column 3, line 4.), wherein pixel signals obtained by the first light receiving area and the second light receiving area are read out from the image sensing element via a same channel (All of the chips (I, II, etc.) are connected in serial such that they are all output onto a common output line such that the set of chips "in effect acts as one large chip with a single shift register", column 4, line 62 through column 5, line 12, figure 7.).

However, TeWinkle does not explicitly teach of a correction device, or of a control device controlling said correction device.

Saito et al. similarly teaches an image sensing element (CCD module, 1, figure 1) containing a first light receiving area (line sensor, 11a) and second light receiving area (line sensor, 11b), column 4, lines 6-16. However, in addition to the teachings of TeWinkle, Saito et al. teaches that the difference in sensitivity between respective line

sensor arrays can cause adverse effects in the output images (column 1, line 56

through column 2, line 30).

Therefore, Saito et al. teaches:

a correction device (ADC portion, 22) which corrects a pixel signal output from

said image sensing element (The A/D conversion is adjusted to correct for differences in

the sensitivities of the line sensors (11a and 11b), column 9, lines 1-13. This process is

detailed further in figure 5 and column 8, line 4 through column 9, line 13.); and

a control device (DAC portion, 23) which controls said correction device (22) to

multiply a correction value to pixel signals read out from the first light receiving area

(11a) and the second light receiving area (11b) via the same channel ("A") and to write

the pixel signals to which the correction value is multiplied to a memory (RAM 24a, 24b,

column 7, lines 24-30) as pixel data of a captured image (The A/D conversion range

used the for individual sensors is set based upon the sensitivities of the individual

sensors, and this A/D conversion range is adjusted based upon the output of the DAC

(23), column 6, lines 13-29, column 8, lines 14-24 and lines 63-67, column 9, lines 1-

13.), wherein

said correction device (22) corrects the pixel signal output from said image

sensing element so that a difference between the pixel signals read out from the first

light receiving area and the second light receiving area is canceled (The sensitivity

difference is corrected, column 9, lines 1-13.).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to include a correction device taught by Saito et al. in the

image sensing apparatus taught by TeWinkle for the benefit of preventing adverse

effects in the output images of respective sensor arrays due to the difference in

sensitivity between the respective sensor arrays (Saito et al., column 1, line 56 through

column 2, line 30).

Consider claim 2, and as applied to claim 1, TeWinkle additionally teaches that

color filters of a plurality of colors are formed on the first and second light receiving

areas (A "full-color version" typically has three parallel linear arrays of photosensors (i.e.

three blocks), each array being sensitive, such as by the inclusion of a color filter layer,

to one primary color, column 3, lines 34-42.). As Saito et al. teaches that individual

linear arrays differ in sensitivity (see claim 1 rationale), and TeWinkle teaches that

individual linear arrays (i.e. individual blocks) each contain color filters sensitive to one

primaray color (column 3, lines 34-42), the combination of TeWinkle and Saito et al.

teaches using a different correction value for each color (i.e. for each block).

Consider claim 5, and as applied to claim 1 above, TeWinkle additionally teaches

that color filters of a plurality of colors are formed on the first and second light receiving

areas (A "full-color version" typically has three parallel linear arrays of photosensors,

each array being sensitive, such as by the inclusion of a color filter layer, to one primary

color, column 3, lines 34-42.). As Saito et al. teaches that individual linear arrays differ

in sensitivity (see claim 1 rationale), and TeWinkle teaches that individual linear arrays

each contain color filters sensitive to one primaray color (column 3, lines 34-42), the

combination of TeWinkle and Saito et al. teaches using a different correction value for

each color.

Claim 6 recites an image sensing apparatus similar to the image sensing

apparatus recited in claim 1, and matching features are rejected using the same

rationale (see claim 1 above).

TeWinkle additionally teaches that color filters of a plurality of colors are formed

on the first and second light receiving areas (A "full-color version" typically has three

parallel linear arrays of photosensors, each array being sensitive, such as by the

inclusion of a color filter layer, to one primary color, column 3, lines 34-42.). As Saito et

al. teaches that individual linear arrays differ in sensitivity (see claim 1 rationale), and

TeWinkle teaches that individual linear arrays each contain color filters sensitive to one

primaray color (column 3, lines 34-42), the combination of TeWinkle and Saito et al.

teaches using a different correction value for each color.

Consider claim 7, and as applied to claim 6 above, TeWinkle additionally teaches

that the image sensing element outputs a signal from a different output unit for each

light receiving area (A different output (SROUT) is provided for each light receiving area

(I, II, etc.) of the image sensing element, figure 7, column 5, lines 4-12.). TeWinkle

does not explicitly teach performing correction. Saito et al. teaches that a different

correction value is used for each linear array and thus each output unit (see claims 1

and 6 rationale).

Consider claim 8, and as applied to claim 6 above, TeWinkle does not explicitly teach performing correction.

Saito et al. further teaches that correction is performed using a different correction value for each lens (As a lens directs light to the line sensors (column 8, lines 37-38), and different correction values are used for each line sensor (see claims 6 and 1 rationale), a different correction value is used for each lens.).

6.   Claims 3, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over TeWinkle in view of Saito et al. as applied to claims 1 and 6 above, and further in view of Okisu et al. (US 6,571,022).

Consider claim 3, and as applied to claim 1 above, TeWinkle further teaches that the light receiving areas include at least three partial image sensing regions in one direction (see I, II, etc., figure 7). Saito et al. teaches that different correction values are used for individual linear arrays (see claim 1 rationale). However, the combination of TeWinkle and Saito et al. does not explicitly teach that said correction device corrects at least two of the three partial image sensing regions with correction values by using as a reference a central partial image sensing region selected from the three partial image sensing regions.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12)

and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27.

Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture

left and right partial images.), and a correction device which corrects a pixel signal

output from said image sensing element (See figures 8 and 9. The image sensing

element (12, 13) outputs signals to an image processor (19). The image processor (see

figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-

67. The shading corrector (194) corrects output levels of pixels of the image sensing

element (12, 13), column 8, lines 19-22.).

      However, Okisu et al. further teaches:

      The light receiving areas (12, 13) include at least three partial image sensing

regions in one direction, and said correction device corrects at least two of the three

partial image sensing regions with correction values by using as a reference a central

partial image sensing region selected from the three partial image sensing regions

(Okisu et al. teaches that three or more image pickup regions (i.e. light receiving areas)

can be used, column 23, line 64 through column 24, line 2. Okisu et al. further teaches

normalizing the pixel values to the center of a light receiving surface (i.e. a central

partial image sensing region), column 9, lines 50-55.).

      Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to use the central image sensing region taught by the

combination of TeWinkle and Saito et al. as a reference as taught by Okisu et al. to

obtain predictable results while applying a known technique to a known device.

Consider claim 4, and as applied to claim 1 above, the combination of TeWinkle and Saito et al. does not explicitly teach performing correction using different correction values in a boundary direction between the light receiving areas.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that said correction device performs correction using different correction values in a boundary direction between light receiving areas (Because different correction values are used for each pixel (column 9, lines 55-58) of each light receiving area (column 10, lines 24-27), and a boundary can be randomly produced using a variety of shapes (see figure 26A and 26B, column 15, line 51 through column 16, line 3), different correction values are used based on which pixels of the various light receiving regions comprise the boundary.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the correction device taught by the combination of

TeWinkle and Saito et al. use different correction values in the boundary direction as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Consider claim 9, and as applied to claim 6 above, the combination of TeWinkle and Saito et al. does not explicitly teach that correction is performed using a different correction value for each exit pupil position of an optical system.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that correction is performed using a different correction value for each exit pupil position of an optical system (Different correction values are used for each pixel, column 9, lines 55-58. Each pixel has a separate lens which has a different optical characteristic, which different optical characteristic would cause different exit pupil positions. See figures 11-13, column 8, lines 47-58.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the correction device taught by the combination of TeWinkle and Saito et al. use different correction values for different exit pupil positions as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Consider claim 10, and as applied to claim 6 above, the combination of TeWinkle and Saito et al. does not explicitly teach that correction is performed using a different correction value for each F-number.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that correction is performed using a different correction value for each F-number (Different correction values are used for each pixel, column 9, lines 55-58. Each pixel has a separate lens which has a different optical

characteristic, which different optical characteristic would cause each lens to have a

different F-number. See figures 11-13, column 8, lines 47-58.).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to have the correction device taught by the combination of

TeWinkle and Saito et al. use different correction values for F-numbers as taught by

Okisu et al. to obtain predictable results while applying a known technique to a known

device.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ALBERT H. CUTLER whose telephone number is

(571)270-1460. The examiner can normally be reached on Mon-Thu (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AC

/Sinh Tran/
Supervisory Patent Examiner, Art Unit 2622